

Rocky Flats Environmental Technology Site

4-I62-ENV-OPS-FO.44

ADMIN RECORD

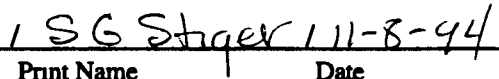
REVISION 0

GRANULAR ACTIVATED CARBON TRANSFER OPERABLE UNIT 2, FIELD TREATABILITY UNIT

APPROVED BY



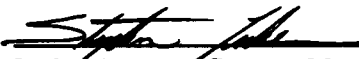
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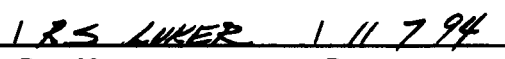
Print Name

Date

EG&G Environmental Restoration Program Division



Quality Assurance Program Manager



Print Name

Date

Data Management and Reporting Services

DOE RFFO/ER Concurrence on file ☐ Yes ☒ No ☐ NAEnvironmental Protection Agency Approval Received ☐ Yes ☒ No ☐ NAResponsible Organization Environmental Restoration Program Division Effective Date 05-22-95

CONCURRENCE BY THE FOLLOWING DISCIPLINES WILL BE DOCUMENTED IN THE PROCEDURE HISTORY FILE

Data Management and Reporting Services
Environmental Operations Management
Industrial Hygiene
Occupational Safety
Operable Unit 2 Closure
Radiological Health and Engineering
Surface Water Division
Waste Management

USE CATEGORY 3

ORC review not required

The following have been incorporated in this revision
94 DMR 000192

Periodic review frequency 1 year from the effective date

DOCUMENT CLASSIFICATION
REVIEW WAIVER PER
CLASSIFICATION OFFICE

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1 PURPOSE

This procedure describes the administrative and operational steps used at the Rocky Flats Environmental Technology Site for transferring granular activated carbon (GAC) from and to the vessels located in Trailer (T) 900C at the Operable Unit 2 Field Treatability Unit (FTU)

2 SCOPE

This procedure applies to all normal transfer operations of the GAC treatment equipment at the Operable Unit 2 FTU facility by Environmental Restoration Program Division (ERPD) Operations Support and subcontractor personnel

This procedure addresses the following topics

- Removing granular activated carbon from an adsorber
- Filling an adsorber with granular activated carbon
- Backwashing an adsorber
- Replacing an entire adsorption column

3 OVERVIEW

This procedure implements the requirements for GAC transfer operations at the FTU at Operable Unit 2

The requirements of this procedure were established to ensure that normal GAC transfer operations at the FTU are accomplished in a uniform and safe manner. This procedure shall be used by the operator(s) during all normal GAC transfer operations.

The spent GAC may be removed from the system using one of two approved methods

- The entire adsorption column may be physically removed from T900C and used for storage of the spent GAC
- The spent GAC may be transferred from the adsorption column into a bulk back bin without the necessity of physically moving the column. The column may then be filled with virgin GAC and placed back in service. This procedure provides the instructions necessary to accomplish the transfer operations

4 RESPONSIBILITIES

4.1 Operator

Operates and monitors FTU system equipment

Reports abnormal conditions, occurrences, and incidents to Shift Foreman

4.1 Operator (continued)

Ensures visitors comply with the Rocky Flats Plant Operable Unit 2 Field Treatability Unit Health and Safety Plan (HASP)

Completes required logs and forms

4.2 Responsible Manager

Ensures that all personnel including subcontractors, are trained and qualified to perform the duties, tasks, and responsibilities described in this procedure

Ensures that all core and ERPD-specific training has been completed and documented, and that copies of all documentation have been forwarded to the ERPD training files

4.3 Shift Foreman

Responds to and reports all spills in accordance with 1-10000-HWR, Hazardous Waste Requirements Manual, Section 4 0

5 LIMITATIONS AND PRECAUTIONS

The GAC is used for the removal of organic compounds and precautions shall be taken to ensure that operators are not exposed to organic levels above the appropriate limits The HASP provides specific instructions for work area monitoring and requirements for Personal Protective Equipment (PPE)

6 PREREQUISITES

6.1 Field Preparation

6 1 1 Preparations For Transfer

Operator

- [1] Ensure that the spent GAC column identified for carbon replacement is isolated from the GAC treatment system in accordance with the instructions contained in 4-159-ENV-OPS-FO 41, System Normal Operations Operable Unit 2, Field Treatability Unit

Project Manager

- [1] Establish a work package in accordance with the requirements to cover the specific actions anticipated
- [2] Conduct a safety briefing covering GAC change-out operations prior to the initiation of this procedure in accordance with the HASP

6 1.2 Preparations for Adsorber Backwash Operation

Operator

- [1] Ensure that the Microfiltration System is in operation when backwash is performed
- [2] Ensure that the system is in Recirculation mode in accordance with 4-159 -ENV-OPS-FO 41
- [3] Ensure that the GAC vessel to be backwashed has hoses connected in the normal operation configuration
- [4] Ensure that V-96 is fully open so that influent flow is at maximum (approximately 70 gpm)
- [5] Ensure that levels in TK-8 and TK-11 are in the upper half of the operating level to provide adequate water for the backflush operation

7 INSTRUCTIONS

7.1 Granular Activated Carbon Removal From an Adsorber to Bulk Back Bin

Operator

- [1] Verify that all appropriate prerequisite actions in Section 6, Prerequisites have been completed and record in the OU 2 Operations Log Book
- [2] Don the appropriate PPE as required in the HASP
- [3] Position an empty bulk back bin next to the spent GAC adsorber
- [4] Close the valves in the 1-in and 3-in lines at the bottom of the bulk back bin
- [5] Connect one end of a 3-in hose to the carbon outlet line on the spent GAC adsorber
- [6] Place the other end of the hose in the opening on top of the bin and secure it so that it cannot move
- [7] Connect a hose to the 2-in drain line at the bottom of the bulk back bin and connect the other end to the suction connection on an air driven diaphragm pump
- [8] Connect a discharge hose to the discharge connection of the air driven diaphragm pump and direct it to the Equalization Tank

This tank has an available capacity of at least 350 gal for collection of the water produced during the transfer

- [9] Firmly secure the discharge hose to the top of the Equalization Tank
- [10] Using the Wilden M-4 pump, pump the water directly to the Equalization Tank through the discharge hose
- [11] Connect a compressed air line to the fitting on the top of the spent GAC adsorber

CAUTION

Pressurizing the GAC adsorber to 15 psig will cause rupture disc failure

- [12] Pressurize the vessel to 5 to 10 psig as follows in T900B
 - [A] Close V-105
 - [B] Observe pressure gage PI-7

71 Granular Activated Carbon Removal From an Adsorber to Bulk Back Bin (continued)

Operator (continued)

[C] Open V-43

[13] Open the valve in the carbon outlet line at the bottom of the spent GAC adsorber to begin transferring the spent GAC into the bulk back bin

[14] WHEN spent GAC flow is initiated,
THEN open the 2-in. valve in the drain septum, and begin draining or pumping the water from the bin This is necessary to prevent overfilling the bin with carbon slurry

[15] WHEN air flow is detected in the carbon outlet line,
THEN close V-43

[16] WHEN the pressure in the spent GAC adsorber is relieved,
THEN close the 3-in valve in the carbon outlet line

[17] Flush the GAC adsorber with water to remove any carbon remaining in the vessel.

[A] Contact the Health and Safety Specialist to conduct air monitoring in accordance with the HASP, during blank flange removal from the top of the bin

[B] Remove the blank flange from the top of the bin.

[C] Connect a garden hose with spray nozzle to V-39

[D] Open V-99

[E] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in HAND, and observe that the control switch illuminates

The illuminated control switch lamp is an indication that the pump is RUNNING.

[E] Open V-39 and spray down the inside of the adsorber using a garden hose

[18] WHEN flushing of adsorber is complete,
THEN

[A] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF and observe that the control switch lamp goes out.

The control switch lamp going out is an indication that the pump is OFF

7.1 Granular Activated Carbon Removal From an Adsorber to Bulk Back Bin (continued)

Operator (continued)

[B] Close V-99

[C] Close V-39

- [19] Ensure that the adequate capacity is available in the equalization tank to recover the flush water during the transfer
- [20] Repressurize the vessel to 5 to 10 psig by opening the air valve V-43 in T900B
- [21] Open the 3-in valve in the carbon outlet line to start the carbon flow to the bulk back bin
- [22] **WHEN** air flow is detected in the carbon outlet line
THEN close V-43 in the air line
- [23] **WHEN** the pressure in the spent GAC adsorber is relieved,
THEN close the 3-in valve in the carbon outlet line
- [24] Repeat steps [17] through [23] as required until all the carbon is removed from the adsorber
- [25] **WHEN** all the water is pumped from the bulk back bin,
THEN close the 1-in drain valve and disconnect the hoses
- [26] Remove the transfer line
- [27] Attach the lid to the bulk back bin
- [28] Record all activities in the OU 2 Operations Log Book

7.2 Filling an Empty Adsorber with Bagged Carbon

Operator

- [1] Verify that all appropriate prerequisite actions in Section 6, Prerequisites have been completed and record in the OU 2 Operations Log Book
- [2] Don the appropriate PPE as required in the HASP
- [3] Remove the cover from the nozzle at the center of the top of the adsorber vessel
- [4] Fill the adsorber with carbon by opening the bags and dumping the contents into the vessel Use 37 bags (55 lbs each) of GAC to fill the adsorber vessel

7.2 Filling an Empty Adsorber with Bagged Carbon (continued)

Operator (continued)

- [5] WHEN the adsorber is filled,
THEN replace the cover on the nozzle located on top of the vessel
- [6] Fill the vessel using the water line located at the bottom of the vessel
 - [A] Open the valve in the vessel vent line

NOTE *As the vessel fills up with water, the carbon in the vessel will generate heat*

The vessel should be filled slowly (2 to 3 hours) to allow air to escape and fully wet the carbon.

- [B] Open the valve in the water line to the vessel.
- [C] Monitor the water level increase in the vessel using the hot and cold interface
- [7] WHEN the vessel is full,
THEN
 - [A] Close the valve in the water line to the vessel
 - [B] Close the valve in the vessel vent.
- [8] Allow the carbon to soak for a minimum of 24 hours at ambient temperature
- [9] WHEN the soak period is completed,
THEN add water as required to ensure the vessel is completely full by repeating steps [6] and [7]
- [10] Place the vessel in service in accordance with 4-159-ENV-OPS-FO 41
- [11] Record all activities in the OU 2 Operations Log Book.

7.3 Adsorber Backwash Operation

Operator

- [1] Verify that all appropriate prerequisite actions in Section 6, Prerequisites have been completed and record in the OU 2 Operations Log Book.

7.3 Adsorber Backwash Operation (continued)

Operator (continued)

[2] **IF** backwashing Adsorber A,
THEN

[A] Open

- V-209
- V-210

[B] Close

- V-207
- V-208
- V-213
- V-215

[C] Open V-206

[D] GO TO Step [6]

[3] **IF** backwashing Adsorber B,
THEN

[A] Open

- V-214
- V-215
- V-217

[B] Close

- V-208
- V-209
- V-211
- V-212
- V-213
- V-216
- V-218
- V-219
- V-220
- V-221

[C] Open

- V-206
- V-207

[D] GO TO Step [6]

7.3

Adsorber Backwash Operation (continued)

Operator (continued)

[4] **IF** backwashing Adsorber C,
THEN

[A] **Open**

- V-215
- V-216
- V-220
- V-221
- V-223

[B] **Close**

- V-208
- V-209
- V-211
- V-212
- V-213
- V-214
- V-217
- V-218
- V-219
- V-222
- V-224
- V-225
- V-227

[C] **Open**

- V-206
- V-207

[D] **GO TO Step [6]**

[5] **IF** backwashing Adsorber D,
THEN

[A] **Open.**

- V-215
- V-216
- V-221
- V-222
- V-226
- V-227
- V-229

7.3 Adsorber Backwash Operation (continued)

Operator (continued)

[B] Close

- V-208
- V-209
- V-211
- V-212
- V-213
- V-214
- V-217
- V-218
- V-219
- V-220
- V-223
- V-224
- V-225
- V-228
- V-230
- V-231

[C] Open

- V-206
- V-207

[D] GO TO Step [6]

CAUTION

Pressurizing the vessel to 15 psi will cause rupture disc failure

- [6] Slowly close V-203 and monitor system pressure at PI-7 while closing valve. Normal observed pressure is approximately 10 psi. Do **NOT** exceed 15 psi to prevent rupture disc failure.
- [7] During backwash operation
- [A] Observe that tank level for TK-8 does not go below 35 inches
- [B] Observe that tank level for TK-11 does not go below 30 inches
- [B] Observe that GAC system pressure at PI-7 does not go above 10 psi
- [8] Backwash for 30 min or until the level in TK-11 drops below 56 inches

7.3 Adsorber Backwash Operation (continued)

Operator (continued)

- [9] Open V-203 and V-204
- [10] Close V-206 and V-207 to return the system to the Recirculation mode
- [11] Reduce Effluent Flow Controller normal operating flow rate (25 to 50 gpm)
- [12] Return GAC system vessel valves to normal operating lineup
- [13] Place the system in Discharge operation or Shutdown in accordance with 4-159-ENV-OPS-FO 41, System Normal Operations Operable Unit 2, Field Treatability Unit.
- [14] Record all activities in the OU 2 Operations Log Book.

7.4 Replacing Entire Adsorption Column

Operator

- [1] Verify that all appropriate prerequisite actions in Section 6, Prerequisites have been completed and record in the OU 2 Operations Log Book.
- [2] Don the appropriate PPE as required in the HASP
- [3] Close the influent isolation valve to the spent adsorber unit
- [4] Close the adsorber effluent isolation valve
- [5] Contact the Health and Safety Specialist to conduct air monitoring in accordance with the HASP when the adsorber vent is opened
- [6] Open the adsorber vent.
- [7] Disconnect hoses from vessel connections.
- [8] Open the side doors of the trailer next to the vessel that is to be changed.
- [9] Place a drum containment pallet on the ground outside the side doors of the trailer
- [10] Place a clean 55-gal drum into the containment pallet
- [11] Connect a drain hose on the discharge of the effluent isolation and run to the fill port of the 55-gal drum.

7.4 Replacing Entire Adsorption Column (continued)

Operator (continued)

- [12] Open the effluent isolation valve of the adsorber and drain the adsorber to the drum
- [13] Close the effluent isolation valve of the adsorber when the drum is full
- [14] Remove the drum from the containment pallet
- [15] Repeat Steps [9] through [13] until a pencil thin stream of water is draining from the adsorber
- [16] Replace the caps on all outlets
- [17] Remove the bolts from the angle iron hold downs and remove hold downs
- [18] Using a forklift, remove the spent adsorber unit from the trailer
- [19] Using the forklift, set the new adsorber unit into trailer
- [20] Replace the angle iron hold downs and install the bolts
- [21] Remove the caps on all outlets of the new adsorber
- [22] Reconnect all hoses to the vessel connections
- [23] Record all activities in the OU 2 Operations Log Book

8 RECORDS

Management of all records is consistent with 1-77000-RM-001, Records Management Guidance for Records Sources

Project Manager

- [1] Ensure that the original and one copy of the following quality-related records, as appropriate, are transmitted to the ERPD Project File Center in accordance with 2-G18-ER-ADM-17 01, Records Capture and Transmittal
 - OU 2 Operations Log Book
 - Qualification/Training Documentation, as required
 - Occurrence Reports, as required

Submission of record copies to the ERPD Project File Center satisfies Administrative Record requirements as defined in 3-21000-ADM-17 02, Administrative Records Screening and Processing

8. RECORDS (continued)

There are no nonquality records generated by this procedure

9 REFERENCES

Rocky Flats Plant Operable Unit 2 Field Treatability Unit Health and Safety Plan

1-10000-HWR, Hazardous Waste Requirements Manual

1-77000-RM-001, Records Management Guidance for Records Sources

2-G18-ER-ADM-17.01, Records Capture and Transmittal

3-21000-ADM-17 02, Administrative Records Screening and Processing

4-159-ENV-OPS-FO 41, System Normal Operations Operable Unit 2, Field Treatability Unit

APPENDIX 1

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OPERABLE UNIT 2 SYSTEM VALVES

VALVE NO	SIZE/TYPE	MANUAL	LOCATION	FUNCTION
V-1	6 in BFLY*	M	Suction of PP-8-1	Feed to PP-8-1
V-2	6 in BFLY*	M	Discharge of PP-8-1	Feed to Top Train
V-3	6 in BFLY*	M	Discharge of PP-8-1	Feed to Middle Train
V-4	6 in BFLY*	M	Discharge of PP-8-1	Feed to Bottom Train
V-5	6 in BFLY*	M	Module Train Discharge	Discharge from Top Train
V-6	6 in BFLY*	M	Module Train Discharge	Discharge from Middle Train
V-7	6 in BFLY*	M	Module Train Discharge	Discharge from Bottom Train
AV-8	2 in BALL	A	Bottom Train Discharge	Cleaning Inlet
AV-9	2 in BALL	A	Top Train Inlet	Cleaning Outlet
V-10	2 in BALL	M	Cleaning Pump CP-1	Cleaning Pump Discharge
AV-11	2 in BALL	A	Cleaning Pump Discharge	Cleaning Return to TK1 and 2
AV-12	2 in BALL	A	TK-9	CP-1 Pump Suction
AV-13	2 in BALL	A	TK-10	CP-1 Pump Suction
AV-14	2 in BALL	A	TK-9	TK-10 Fill Inlet
AV-15	2 in BALL	A	TK-9	TK-9 Cleaning Return
AV-16	2 in BALL	A	TK-9	TK-9 Filtrate Return
AV-17	2 in BALL	A	TK-10	TK-10 Cleaning Return
AV-18	2 in BALL	A	TK-10	TK-10 Filtrate Return
AV-19	3 in BFLY	A	Filtrate to Neutralization	Filtrate Open/Close
V-20	2 in BALL	M	TK-9 and TK-10	TK-9 and TK-10 Drain
V-22	2 in BALL	M	TK-8 Drain	TK-8 Drain
V-23	2 in BALL	M	Sludge Pump	Sludge Pump Suction
V-24	2 in BALL	M	TK-11	TK-11 Drain
V-25	2 in BALL	M	TP-11-1 Inlet	TP-11-1 Suction
V-29	2 in BALL	M	TP-11-1	Flow Control to GAC
AV-30	2 in BALL	A	Top Train Inlet	Cleaning Return to TK-8
V-31	2 in BALL	M	TP-11-2	TP-11-2 Feed

* = Butterfly

APPENDIX 1

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-33	2 in BALL	M	TK-9	Chemical Fill
V-34	2 in BALL	A	TK-10	Chemical Fill
AV-35	2 in BALL	M	Filtrate above PP-8-1	Filtrate Return to TK-8
V-37	1/2 in BALL	M	Seal Water Filter	Seal Water Filter Isolation
V-38	2 in. BALL	M	TP-11-1	Trailer No 1 Water Supply
V-39	2 in BALL	M	TP-11-1	Trailer Hose Down
V-40	2 in BFLY*	M	Bottom Train No 1	Train No 2 Isolation
V-41	2 in BFLY*	M	Middle Train No 2	Train No 3 Isolation
V-55	2 in. BALL	M	Effluent from TK-6	Drain
V-57	2 in. BALL	M	Effluent from TK-5	Drain
V-58	1 in BALL	M	Effluent from TK-5	Influent to Acid Metering Pump
V-59	1 in BALL	M	Influent to TK-4	TK-4 Fill Water
V-61	1 in BALL	M	Top of TK-6	Lime Tank Water Fill
V-64	1/2 in BALL	M	Top of TK-1	Acid Delivery
V-65	1 1/2 in BALL	M	Top of TK-2	Lime Delivery
V-66	2 in. BALL	M	Bottom, Left Side, TK-1	Drain
V-67	2 in BALL	M	Bottom, Right Side, TK-2	Drain
AV-80	1 1/2 in BALL	A	Effluent from TK-11	Filtrate Discharge Flow Control
V-81	1/2 in BALL	M	Influent to TK-2	Sulfuric Acid Injection
V-82	1 in. BALL	M	Effluent from Seal Water	Distribute Seal Water
V-83	3 in BALL	M	West End of T900A	Drain for T900A
V-84	1 in. BALL	M	Top of TK-5	Influent Water to TK-5
V-85	1 in BALL	M	Influent Water to Lime	Lime Line Flush
V-86	1 in BALL	M	Effluent from TK-6	Lime Pump Suction Isolation
V-87	1 in BALL	M	Effluent from Lime Pump	Lime Pump Discharge Isolation

* = Butterfly

APPENDIX 1

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-90	1 1/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-91	1 1/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-92	2 in BALL	M	Effluent from Sludge Wilden Pump	Drain
V-93	2 in BALL	M	Sludge Pump Suction	Sludge Pump Suction Isolation
V-94	3 in BALL	M	West End of T900B System	Drain for T900B
V-95	2 in BALL	M	Influent to TK-1	Influent Isolation
V-96	2 in GATE	M	Influent to TK-1	Flow Adjust to TK-1
V-97	1/2 in BALL	M	Influent Air to Filter Press	Blow Down Filter Press
V-98	2 in BALL	M	TK-11 Filtrate Recirculation	Recirculation from TK-11 to
V-99	2 in BALL	M	Effluent from TK-11	Recirculate TK-11
V-100	3 in GATE	M	Membrane Discharge	Control Flow to TK-11
V-101	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-102	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-103	3/4 in BALL	M	Influent to TK-12	TK-12 Flush Line
V-200	2 in BALL	M	Influent Line to GAC	Processed Water into GAC
V-201	2 in BALL	M	Effluent from EQ** Tank	Influent to TK-1
V-202	3 in BALL	M	Effluent Line to EQ** Tank	Influent to Pump or Sock Filters
V-203	2 in BALL	M	Influent Line to GAC	Recirculation to EQ** Tank
V-204	2 in BALL	M	Influent Line to GAC	Recirculation to EQ** Tank
V-205	PRESSURE	M	Influent Line to GAC	GAC Pressure Adjustment
V-206	3 in BALL	M	Treated Effluent Line before GAC A	Treated Effluent Discharge

** = Equalization

APPENDIX 1

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-207	3 in. BALL	M	Return Line to EQ** Tank before GAC A	Effluent Return to EQ** Tank
V-208	3 in BALL	M	Treated Effluent Line before GAC A	Influent to GAC A
V-209	3 in BALL	M	Return Line to EQ** Tank before GAC A	Backwash Return to EQ** Tank
V-210	3 in BALL	M	Middle Line GAC Piping	Isolation Valve
V-211	3 in BALL	M	Treated Effluent Line	Effluent from GAC A
V-212	3 in BALL	M	Return to EQ** TK	Backwash or Rupture Disk
V-213	3 in BALL	M	Treated Effluent Line between GAC A and B	Influent to GAC B
V-214	3 in. BALL	M	Return to EQ** TK	Backwash Return to EQ** Tank
V-215	3 in BALL	M	Treated Effluent Line in	Treated Effluent Discharge
V-216	3 in BALL	M	Return to EQ** TK in front	Backwash or Rupture Disk
V-217	3 in BALL	M	Treated Effluent Line	Effluent from GAC B
V-218	3 in BALL	M	Return to EQ** TK	Backwash or Rupture Disk
V-219	3 in BALL	M	Treated Effluent Line	Influent to GAC C
V-220	3 in BALL	M	Return to EQ** TK between GAC B and C	Backwash or Rupture Disk Return to EQ**
V-221	3 in BALL	M	Treated Effluent Line in	Treated Effluent Discharge
V-222	3 in BALL	M	Return to EQ** TK in front	Backwash or Rupture Disk

** = Equalization

APPENDIX 1

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VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-223	3 in BALL	M	Treated Effluent Line between GAC C and D	Effluent from GAC C
V-224	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash or Rupture Disk Return to EQ**
V-225	3 in BALL	M	Treated Effluent Line between GAC C and D	Influent to GAC D
V-226	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash Return to EQ** Tank
V-227	3 in BALL	M	Treated Effluent Line in front of GAC D	Treated Effluent Discharge
V-228	3 in BALL	M	Return to EQ** TK in front of GAC D	Backwash or Rupture Disk Return to EQ**
V-229	3 in BALL	M	Treated Effluent Line after GAC D	Effluent from GAC D
V-230	3 in BALL	M	Return Line to EQ** Tank after GAC D	Effluent Return to EQ** Tank
V-231	3 in BALL	M	Treated Effluent Line after GAC D	Final Effluent Discharge
V-232	3 in BALL	M	Return Line to EQ** Tank after GAC D	Final Effluent Return to EQ** Tank

** = Equalization